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A. W. H. NEEDLER, *Director*



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The Herring, Alewife and Shad

L. R. Day

The herring family, Clupeidae, consisting of the herrings, sprats, shads, alewives, pilchards and menhadens, are the most familiar of northern sea food-fishes and by far the most abundant in numbers of individuals. In our Canadian Atlantic waters, only the Atlantic herring, *Clupea harengus* (Linnaeus), the alewife, *Pomolobus pseudoharengus* (Wilson), and the shad, *Alosa sapidissima* (Wilson), are present and provide valuable commercial fisheries. These three fishes all have thin deep bodies, soft fins, well-forked tails and large silvery scales that rub off easily, and resemble one another so closely that they are often confused even by the fishermen who constantly handle them.

This is the third (see foot-note) in a series of circulars being prepared to show how fishes which are often confused can readily be distinguished by means of their different external features. A short account of the distribution, life history and economic importance of each fish is included.

HERRING, ALEWIFE OR SHAD?

The **HERRING** has a thin body which is 4 1/2 times longer than deep. It is not heavy in the forepart of the body. The edge of the belly is U-shaped and not saw-toothed and has a gray lining. There are no dark spots behind each gill-cover. The lower jaw projects beyond the upper when the mouth is closed. The upper jaw is not notched at the tip. Maximum length is about 1 1/2 feet.

The **ALEWIFE** has a thin body which is 3 1/2 times longer than deep. It is heavy in the forepart of the body. The edge of the belly is V-shaped and strongly saw-toothed and has a gray lining. There is a single dark spot behind each gill-cover. The lower jaw projects beyond the upper when the mouth is closed. The upper jaw is notched at the tip. Maximum length is about 1 foot.

The **SHAD** has a thin body which is 3 times longer than deep. It is heavy in the forepart of the body. The edge of the belly is moderately V-shaped and saw-toothed and has a white lining. There is usually a series of dark spots behind each gill-cover. The jaws are of equal length with the tip of the upper deeply notched and enclosing the lower when the mouth is closed. Maximum length is about 2 1/2 feet.

1. "Flounders of the Maritimes" by W. R. Martin (Atlantic Biological Station Circular No. 12, July, 1948.)
2. "The Smelt, Capelin and Silverside" by R. A. McKenzie and L. R. Day (Atlantic Biological Station Circular No. 15, August, 1949.)

THE HERRING

The herring is one of the most important of the marine food-fishes in the Atlantic Ocean, if not the world. Distributed throughout the entire North Atlantic, it is probably the most numerous fish in these waters. Along the North American coast it is known as far north as northern Labrador and south to the southern New England states. The herring is particularly abundant in the coastal waters of the Canadian maritime provinces including Quebec and Newfoundland. Herring of the North Pacific Ocean are different from, although very close relatives of, the herring of the North Atlantic.

Unlike the alewife and shad, the herring does not enter fresh water but lives in the deeper waters off the coast moving inshore at spawning time. The life of the herring may be divided roughly into three stages suggested by differences in distribution and movements. These are: first, the **young** or "sardine" which are found in scattered schools in our coastal waters and concentrated in dense schools in the Passamaquoddy area of the Bay of Fundy; second, the **immature** or "fat" which are between 2 and 4 years of age and found scattered over such rich feeding grounds as the open waters of the Gulf of St. Lawrence and the offshore banks; third, the **mature** or "spawn" which at 3 or 4 years of age are approaching maturity and have joined the older adults which, just before spawning time, move in vast schools to the shoal coastal waters and on to the spawning grounds. After spawning the "spent" herring disappear and presumably disperse to recover and feed.

Spawning in Canadian maritime waters takes place mainly in the spring, summer and fall. In the Gulf of St. Lawrence there are spring and fall spawning populations, while along the outer coast of Nova Scotia the major spawning takes place in late summer. Spawning occurs in the inshore areas in 2 to 30 fathoms of water. The eggs sink and by means of their coating of mucus stick in layers or clumps to the sand, seaweeds, stones or other objects. Soon after hatching the young herring begin to feed and grow rapidly until they mature at a length of about 10 1/2 inches or more and 3 to 4 years of age.

The herring is fished all along the Canadian Atlantic coastline, but the most productive areas are (1) the Passamaquoddy area of the Bay of Fundy, where there is an intensive year-round fishery for "sardine" herring using weirs, shore seines and purse-seines; (2) Chaleur Bay, Northumberland Strait and the shallows around Magdalen Islands, where there is an inshore fishery for spring spawning herring using gill-nets and trap-nets; (3) southern portion of Nova

H E R R I N G

(*Clupea harengus*)

OTHER COMMON NAMES — Atlantic Herring, Sea Herring, Labrador Herring, "Sardine".

CHARACTERISTICS — Body slender, thin, 4 1/2 times longer than deep. Lower jaw much projecting. Upper jaw not notched. Edge of belly U-shaped and not saw-toothed. Steel blue or greenish blue on back with green reflections; silvery sides and belly. Inner lining of belly gray. Length to 17 inches.

DISTRIBUTION — North Atlantic Ocean; abundant on coast of Europe and America, northern Labrador to southern New England States. Live in sea. Abundant in inshore waters at spawning time in Bay of Chaleur, Northumberland Strait, and around Magdalen Islands and the south-east coast of Nova Scotia. Vast schools often seen at sea in Canadian Maritime waters. Young herring abundant in Passamaquoddy area of Bay of Fundy.

SPAWNING — Coastal waters in spring, summer or autumn depending on locality and habit of local fish. Eggs sink and stick in layers or clumps to sand, seaweed, stones, etc.

FISHING — Gill-nets, trap-nets, also purse-seines in Newfoundland, in coastal waters for adult spawning fish - "Sardines" or young herring caught in abundance in weirs and seines. Highly important commercially as food and bait fish. Also used for fish meal and oil.

A L E W I F E

(*Pomolobus pseudoharengus*)

OTHER COMMON NAMES — Gaspereau, Sawbelly, Branch Herring, Kyak.

CHARACTERISTICS — Body deep and thin, heavy forward, 3 1/2 times longer than deep. Lower jaw projecting. Upper jaw notched. Eye large. Dark green-blue above, darkest on back, paler and silvery on sides and belly. Indistinct dark stripes along length of body of larger fish. Dark spot behind gill-cover. Edge of belly V-shaped and strongly saw-toothed. Inner lining of belly gray. Length to 12 inches.

DISTRIBUTION — Atlantic coast of Canada and United States from Gulf of St. Lawrence to Carolinas. Live in sea entering fresh water in abundance at spawning time. Also "landlocked" in the lakes of western New York and in Lake Ontario.

SPAWNING — Freshwater ponds, lakes and rivers in late April, May and June.

FISHING — Gill-nets, dip-nets and weirs in rivers and estuaries at spawning time. Important commercially as a food and bait fish. Also used for fertilizer.

S H A D

(*Alosa sapidissima*)

OTHER COMMON NAMES — Common Shad, American Shad.

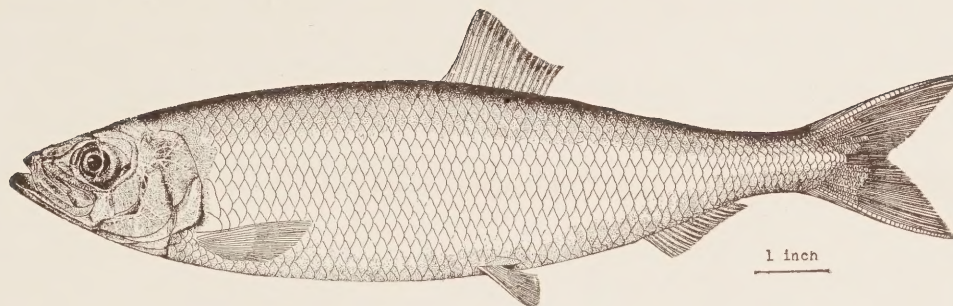
CHARACTERISTICS — Body comparatively deep, thin, 3 times longer than deep, mouth rather large, jaws equal, the lower fitting into a notch in the top of the upper. Dark bluish or greenish above, white and silvery on sides. Usually several dark spots behind gill-cover along side of body. Edge of belly moderately V-shaped and saw-toothed. Inner lining of belly white. Length to 30 inches.

DISTRIBUTION — Atlantic coast of Canada and United States from Gulf of St. Lawrence to Alabama. Live in sea entering fresh water at spawning time. Abundant in Saint John and Miramichi River systems.

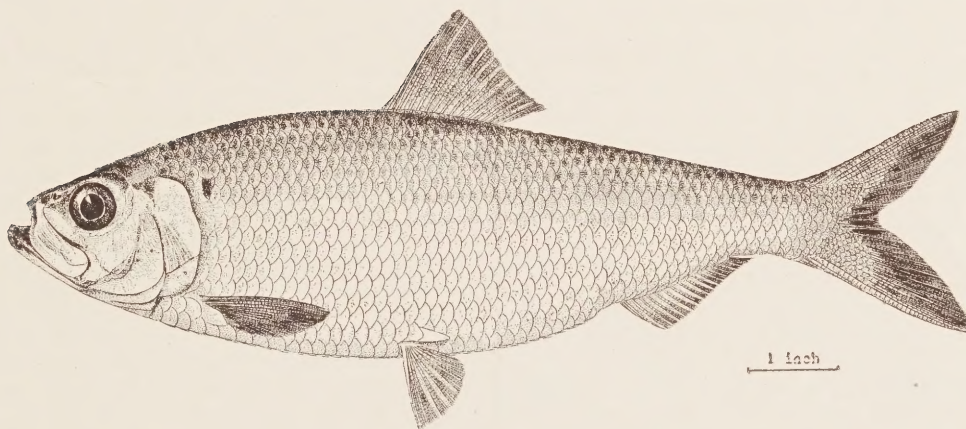
SPAWNING — Freshwater streams and rivers on sandy and often on muddy shallows in May and June.

FISHING — Gill-nets and seines in rivers and estuaries. Valuable commercially as a food fish. Shad "roe" (spawn) is considered a great delicacy.

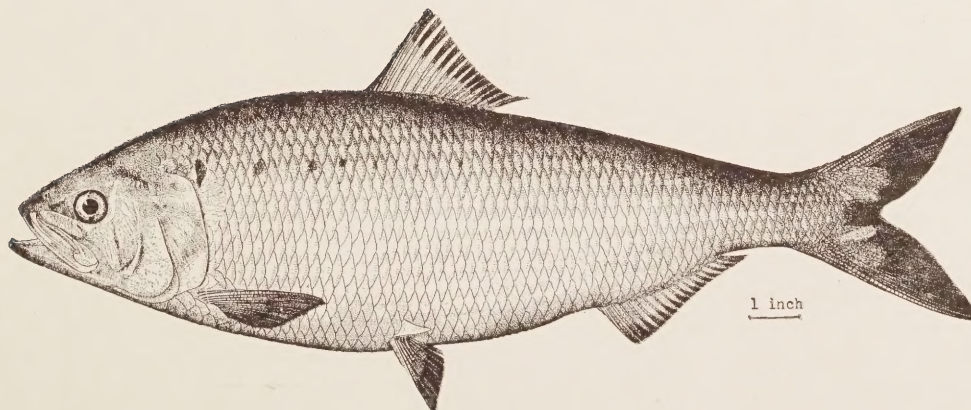
H E R R I N G



A L E W I F E



S H A D



Scotia from Halifax to Yarmouth, where herring which spawn in the late summer are caught along the shore in quantity in gill-nets and trap-nets; (4) south and west coasts of Newfoundland where extensive winter and spring fisheries are carried on for spring spawning herring with gill-nets and where purse-seines have recently come into use.

From 1945 to 1948, well over 200,000,000 pounds of herring have been taken annually from eastern Canadian waters (excluding Newfoundland); of this quantity mature herring normally constitute two thirds of the catch and "sardines" about one third. The marketed value has averaged over \$6,500,000 a year.

The Atlantic coast herring catch forms the basis for a variety of valuable processing activities, great quantities being salted, smoked, or used for bait. Herring are eaten fresh, salted, vinegar-cured, as bloaters (cured and smoked round), smoked boneless or bloater fillets, kippered and canned. About 60% of the quantity caught is used for bait and fertilizer. "Sardines" are used in an important canning industry.

THE ALEWIFE

The alewife is the most abundant sea food-fish entering the rivers of the Atlantic coast of North America. Although its range is similar to that of the shad - namely from the Gulf of St. Lawrence to Florida - it is more generally distributed and enters almost all the rivers frequented by shad and also visits many other streams in large numbers. Some alewives live all year round in the lakes of western New York State and in Lake Ontario where they are dwarfed in size. Alewives in the Canadian maritime waters grow to about 12 inches in length and are on the average 10 inches and weigh about one-half pound.

In the upper Bay of Fundy area, fish of the later part of the alewife "run" are called "blue-backs" or "mulhaden" by the local fishermen because of the bluish cast to the back, their smaller size and fatter condition. As yet there is not sufficient biological evidence for separating these fish from the alewife. No distinction is made in commercial use, both varieties of fish being equally useful for bait and human food.

Like the shad, the alewife moves into fresh water to spawn. The run in Canadian maritime waters generally starts in April about 2 or 3 weeks before the shad. There is, however, a run which is fished in Saint John harbour in late January or early February of each year. The adults spawn in tremendous numbers and seem to prefer the quiet waters of ponds and lakes. However, in the Miramichi and other river systems extensive spawning takes place in the swift waters of the main tributaries. Soon after spawning the adults return to the sea. After hatching the young alewives begin to work their way down stream and by autumn when 2 to 4 inches long have all found their way down to salt water. The alewife remains in the sea until sexually mature at 3 or 4 years of age and very little is known of its habits or migrations. There is some evidence that the alewife, like the shad, returns as an adult to the freshwater system where it was hatched.

The alewife is an excellent food-fish, preferred by many to the sea herring.

The Canadian commercial catch has increased steadily from a low of 2,000,000 pounds in 1921 to 17,000,000 pounds with a marketed value of \$650,000 in 1946. Of the 1946 Canadian catch 10,000,000

pounds were taken from the Saint John River system and the rivers of Kent County, New Brunswick. The fishery is carried on at the time of the spring spawning run by means of gill-nets, dip-nets, traps and weirs in the rivers and estuaries. The fish are marketed fresh, smoked, vinegar-cured, pickled, or canned and provide an excellent bait for cod, haddock and pollack. A considerable quantity is used for fertilizer.

THE SHAD

The shad is the largest of the herring-like fishes which inhabit our Canadian Atlantic waters. Growing to a length of 2 1/2 feet and weighing from 6 to 8 pounds, it is found along the Atlantic coast of North America from the Gulf of St. Lawrence to Florida. Since its distribution bears a definite relation to the location of the large rivers, the shad occurs in greatest abundance in Canadian waters in the Saint John, Petitcodiac, Shubenacadie, Annapolis, Miramichi and St. Lawrence River systems.

Adult shad enter the streams and rivers of the Canadian Atlantic coast in May and June to spawn, sometimes migrating several hundred miles into fresh water for this purpose. However, most of the spawning takes place not far beyond the tidal portion of the rivers. The eggs are liberated over sandy or pebbly shallows where they sink to the bottom. Since the eggs are not adhesive they may be carried considerable distances down stream in running waters. The resulting young spend the summer in the fresh and brackish waters, feeding and growing, and in the fall, having reached a length of 1 1/2 to 4 1/2 inches, leave the rivers and estuaries for the ocean where they remain until they mature at 4 or 5 years of age when they are 18 to 20 inches long. Not much is known of the sea-life of the shad which perhaps lives in the deep water offshore and not too far from the influence of the river in which it was reared. In recent years the recapture of marked young shad has given support to the theory that the mature adults return to their parent river to spawn.

The shad is a great American delicacy and among the most famous of the table fishes. In Canadian waters, however, the supply of shad does not seem to be used to the full, the catch being limited by marketing effort. The Canadian Atlantic catch has varied from a peak of 3,400,000 pounds in 1875 to a low of about 200,000 in 1922. In 1939 the catch exceeded 2,600,000 pounds and has since fluctuated in decline to about 1,800,000 pounds with a marketed value of \$126,000 in 1946. The commercial fishery is carried on through May and June during the spawning migration in the rivers and estuaries by means of gill-nets, weirs and seines. Shad average 4 to 5 pounds in weight in the commercial fishery of the Miramichi River, while those of the Saint John River fishery average around 4 pounds.

The shad is valuable commercially as a food-fish. The demand for shad "roe" as a tasty article of food has steadily increased. Shad are marketed fresh, frozen, smoked, pickled and canned. Recently a new frozen product - filleted, boned shad - has been prepared successfully.

Of interest is the fact that in 1871, shad eggs and young from eastern United States were introduced in California waters where they have thrived. In 1946, 3,500,000 pounds of shad were taken along the Pacific coast of the United States in an increasingly important commercial fishery. Twenty-two hundred pounds were taken in British Columbia waters in the same year.